

## ABSTRACT

1       The present invention overcomes many of the disadvantages of  
2 prior lithographic microfabrication processes while providing further  
3 improvements that can significantly enhance the ability to make more  
4 complicated semiconductor chips at lower cost. A new type of  
5 programmable structure for exposing a wafer allows the lithographic  
6 pattern to be changed under electronic control. This provides great  
7 flexibility, increasing the throughput and decreasing the cost of chip  
8 manufacture and providing numerous other advantages. The  
9 programmable structure consists of an array of shutters that can be  
10 programmed to either transmit light to the wafer (referred to as its  
11 "open" state) or not transmit light to the wafer (referred to as its  
12 "closed" state). The programmable structure can comprise or include  
13 an array of selective amplifiers. Thus, each selective amplifier is  
14 programmed to either amplify light (somewhat analogous to the "open"  
15 or "transparent" state of a shutter) or be "non-amplifying" (its "closed"  
16 or "opaque" state). In the non-amplifying state, some portion of the  
17 incident light is transmitted through the amplifier material. The shutters  
18 and selective amplifiers can work in tandem to form a "programmable  
19 layer". A programmable technique is provided for creating a pattern to  
20 be imaged onto a wafer that can be implemented as a viable production  
21 technique. Thus, the present invention also provides a technique of  
22 making integrated circuits. A diffraction limiter can be used to provide  
23 certain advantages associated with contact lithography without  
24 requiring some of the disadvantages of contact lithography.